

## Capturing the Variability of Fine Particulates Within Travel Microenvironments Using GPS Technology

Dr Stephen Greaves

Senior Lecturer, Transport Management  
University of Sydney  
Faculty of Economics  
Institute of Transport & Logistics Studies (ITLS)  
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Australia

Tel: 00 61 92510078 Fax: 00 61 92510088 email: [stepheng@itls.usyd.edu.au](mailto:stepheng@itls.usyd.edu.au)

While it is an area of ongoing epidemiological debate, evidence is growing that repeated short-term exposures to elevated levels of fine airborne particulate matter (PM<sub>2.5</sub>) are a serious public health concern. Transport microenvironments have received particular scrutiny both because of the higher levels of fine particulates associated with road traffic and the fact people spend a significant amount of time traveling (e.g., 80 minutes/day for residents of Sydney). While several small-scale studies have been completed recently to establish the main factors impacting PM<sub>2.5</sub> exposure, available measurement methods restrict sampling to coarse intervals such as every 30 minutes or by trip. While this provides an indication of total exposure across the sampling interval, it is not able to provide data at the level of time-resolution required to identify peak excursions in PM<sub>2.5</sub> within a journey or associate this with specific elements of that journey such as traveling through a tunnel, idling in heavy traffic, or traveling behind a diesel truck. With this in mind, the current paper reports on a recent study in which the capabilities of a new personal Global Positioning System (GPS) device and portable aerosol monitor are combined to collect these data on a variety of transportation modes in Sydney. This ability to easily collect, report and analyse pollution data at a highly disaggregate temporal and spatial level provides a flexible and powerful tool for identifying intra-trip variability in pollution levels as well as the location and magnitude of peak exposures of PM<sub>2.5</sub>.



Stephen is a Senior Lecturer in Transport Management at the Institute of Transport and Logistics Studies at the University of Sydney. He joined ITLS in February, 2004 after completing three years as a lecturer in transportation at Monash University. His teaching experience includes a wide variety of transportation-related courses at both the undergraduate and postgraduate levels as well as industry-based short courses. Current research activities are focused on the environmental/health externalities of transport and travel choices, and methodological and technological improvements to the collection of travel survey data.